

December 2007 Update

## **Silver Bow Creek/Butte Area Superfund Site**

Butte, Montana

(Five-Year Review Date: 9/30/05)

**Brief Site History:** The boundary of the Silver Bow Creek/Butte Area site begins above Butte, near the Continental Divide, and extends westward along Silver Bow Creek to and including the Warm Springs Ponds (a treatment area). The site covers about 40 miles of stream and stream side habitat. Silver Bow Creek was used as a conduit for mining, smelting, industrial and municipal wastes for more than a hundred years. Vast mine tailings deposits are found along the creek. These deposits contain elevated levels of metals and have been dispersed over the entire flood plain. The site also includes the cities of Butte and Walkerville, as well as the Berkeley Pit and the interconnected mine workings.

Wind-blown particles, groundwater, surface water and soils are contaminated with arsenic and other heavy metals, including copper, zinc, cadmium and lead. Silver Bow Creek and the Clark Fork River contain metals from the cities of Butte to Milltown. The tailings, dispersed along the creek and river, severely limit aquatic life forms and have caused fish kills in the river. Potential health threats include direct contact with or accidentally swallowing contaminated soil, surface water, groundwater or inhaling contaminated air.

The Silver Bow Creek/Butte Area site was added to the National Priorities List in 1983, and is one of four contamination areas, jointly known as the Clark Fork Basin Sites. The others are Milltown Reservoir Sediments, Anaconda Company Smelter, and Montana Pole & Treating.

**Cleanup Activities Completed:** Since the last review, biomonitoring investigations were completed in 2003 to evaluate ecological performance of the Warm Springs Ponds, the Cook Creek sedimentation basin was cleaned and made deeper in 2002 to reduce storm water inputs, and a geotextile and soil cap was added in 2002 to portions of the west Pond 3 dike to create better habitat for vegetation and improve its appearance.

**Current Status:** EPA has completed several removal actions and is now focusing on a cleanup of the rest of the Butte Priority Soils Operable Unit (OU) through long-term remedial response actions.

**Summary of Protectiveness:** Results of the second five-year review indicate completion of only two remedies—at the Rocker and Warm Springs Ponds (WSP) operational units, but with the completion of the remedies at other OUs, protection of human health and the environment as a whole will improve.

**Issues Impacting Protectiveness:** Seasonal exceedances of arsenic concentrations in effluent continue and tighter standards will soon go into effect. The Horseshoe Bend Water Treatment Plant did not meet the final cadmium performance criterion. There has been an increasing trend in benthic macroinvertebrate tissue metal concentrations. The following table summarizes the status of the follow-up actions addressing these issues.

**Silver Bow Creek/Butte Area  
Five-Year Review Update Table  
Review Date 9/30/05**

Issues	Recommendations / Follow-up Actions	Status of Follow-up Actions 12/07	Responsible Party
<b>1. Continual seasonal exceedances of arsenic concentrations in effluent. Meeting arsenic standards for surface water will require an additional treatment step. WSP Active and Inactive OUs.</b>	EPA may conduct arsenic mass loading studies (seasonal) to determine the significance of the arsenic load from the WSP as compared to other sources of arsenic loading in the basin. EPA may initiate additional wildlife studies to determine whether bioaccumulation of arsenic in birds requires mitigation.	First Recommendation - EPA may conduct arsenic mass loading studies (seasonal) to determine the significance of the arsenic load from the WSP as compared to other sources of arsenic loading in the basin. Status of follow-up actions - Additional mass loading studies were performed by Atlantic Richfield Company at EPA's request. Several technical meetings were conducted for the purpose of interpreting new data (both influent and effluent water quality, plus other physical and chemical parameters). It was concluded that an additional treatment step would not reduce arsenic concentrations to levels needed to achieve compliance. Therefore, continued twice-weekly monitoring is recommended, and additional data analysis and interpretation will occur each six months to one year. Second Recommendation - EPA may initiate additional wildlife studies to determine whether bioaccumulation of arsenic in birds requires mitigation. Status of follow-up actions - EPA and U.S. Fish and Wildlife Service concluded that additional wildlife studies, above the biomonitoring program that is already conducted on an ongoing basis, by Atlantic Richfield Company, would not likely reveal any new information.	EPA

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<p><b>2. Increasing trend in benthic macroinvertebrate tissue metal concentrations.</b></p> <p><b>WSP Active and Inactive OUs.</b></p>	<p>Continue periodic monitoring of trends in tissue metal concentrations should be performed to determine if risks are significant to WSP fish or wildlife.</p>	<p>It is important to note that neither the WSP-specific biomonitoring effort of recent years nor the annual benthic macroinvertebrate surveys along the adjacent creeks and river below support the statement that there is an increasing trend. There is biological variability, for certain; however, we cannot verify an increasing trend in tissue metal concentrations. We have therefore called this matter to the attention of both the U.S. Fish and Wildlife Service and the contractor that performs biomonitoring. The current biomonitoring effort and stream surveys of benthic invertebrates, in fact, indicate that benthic "biointegrity" is trending toward a nonimpacted status (from moderately to slightly impacted status), which indicates that risks are decreasing over time. Thus, status of follow-up actions as of this time should read: Biological monitoring continues according to agreed upon protocols and schedules. Twice-per-year data evaluations and technical reviews are conducted.</p>	<p>EPA</p>
<p><b>3. Rebound of arsenic concentrations at Rocker OU below repository is greater than expected.</b></p>	<p>Atlantic Richfield will continue quarterly groundwater sampling and operation and maintenance activities so that any changes in site conditions will be detected.</p>	<p>ARCO continues to sample and no changes have been detected in site conditions</p>	<p>ARCO</p>
<p><b>4. Same as above.</b></p>	<p>EPA to evaluate the protectiveness and continuation of the ¼ mile radius well ban.</p>	<p>Status unchanged.</p>	<p>EPA</p>
<p><b>5. Horseshoe Bend WTP did not meet the final cadmium performance criterion.</b></p>	<p>Atlantic Richfield and Montana Resources to conduct additional performance testing</p>	<p>The treatment plant treats about 3 to 3.5 million gallons per day to industrial standards for use in the concentrator at the mine. Discharge to Silver Bow Creek will not occur until the critical water level is reached (in about 2020 ) or the mine shuts down. The estimated mine life is at least 20 years at current metals prices. ARCO and MR plan to run full scale performance testing this summer or fall to see if they can meet the cadmium final</p>	<p>ARCO/ MDEQ</p>

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		discharge standard. If they do not meet it , they have several alternatives under the Consent Decree to address this issue including tertiary treatment addition, Water Effects Ratio (WER) work (protectiveness analysis) etc.	